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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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09/462,716

08/06/2001

Patrick Schiavone

5310-02200

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35690 7590 12/19/2006

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EXAMINER

GHYKA, ALEXANDER G

ART UNIT

PAPER NUMBER

2812

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
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3 MONTHS

12/19/2006

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

09/462,716

Applicant(s)

SCHIAVONE ET AL.

Examiner

Alexander G. Ghyka

Art Unit

2812

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 14-19 is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

ALEXANDER GHYKA
PRIMARY EXAMINER

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Alh J Ghyka

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date ____.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- ☐ Notice of Informal Patent Application
- ☐ Other: ____.

DETAILED ACTION

Applicants' response of 10/06 has been considered and entered in the record. Claims 1-19 are under consideration. Claims 1-13 are rejected for the reasons of record. With respect to Claims 1-13, Applicants' arguments have been considered but they are not persuasive for the reasons as discussed below. Claims 14-19 are allowable over the cited prior art for the reasons as discussed below

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Herd (EP 0 199 965) in view of Seward , *Densification of Synthetic fused Silica*

under Ultraviolet irradiation, Journal of Non-Crystalline Solids 222, 1997, pgs 407-414 for the reasons of record

The present Claims generally depositing a layer of silicon oxide in the shallow trenches; and irradiating the deposited layer of silicon oxide in the shallow trenches with short wavelength light to densify the layer.

Herd discloses a method of fabricating isolation trenches in semiconductor devices, wherein the oxide is deposited and then irradiated with ultraviolet light. See column 4, lines 30-45 and Figures 1-5. With respect to Claim 4, Herd et al discloses flattening the oxide layer after exposure to ultraviolet light. See Figures 4 and 5. Herd et al differs from the presently claimed invention in that it does not disclose that treating the oxide with ultraviolet light densifies it and does not disclose the wavelength and energy of the irradiation.

Seward et al is relied upon to disclose that ultraviolet irradiation densifies silica, and to disclose the energy and wavelength of the ultraviolet irradiation. See the Abstract, page 407, left column first paragraph and page 408, left column first full paragraph.

It would have been obvious for one of ordinary skill in the art that treating silicon oxide with ultraviolet radiation as disclosed by Herd et al densifies it, as required by the present Claims, as Seward discloses that ultraviolet radiation densifies silicon oxide. A practitioner of the art would find it *prima facie* obvious that densification of the oxide would occur in light of the disclosure of Seward. Moreover, with respect to the ranges as required by Claims 2-3, where the general conditions of a claim are disclosed in the

prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation. See *In re Aller*, 105 USPQ 233, 235 (CCPA 1955). Moreover, the determination of the optimum or workable ranges of a variable, is characterized as routine experimentation. See *In re Antoinei*, 559 F. 2d 618, 195 USPQ 6 (CCPA 1977). In this case, it would be obvious to one of ordinary skill in the art to arrive at the presently claimed UV irradiation and energy in light of the disclosure of the Herd et al and Seward references as a matter of optimization. Furthermore, the recitation "minimizing the corner effect" has not been given patentable weight because the recitation occurs in the preamble. A preamble is generally not accorded any patentable weight where it merely recites the purpose of a process or the intended use of a structure, and where the body of the claim does not depend on the preamble for completeness but, instead, the process steps or structural limitations are able to stand alone. See *In re Hirao*, 535 F.2d 67, 190 USPQ 15 (CCPA 1976) and *Kropa v. Robie*, 187 F.2d 150, 152, 88 USPQ 478, 481 (CCPA 1951).

With respect to Claim 5 and 11, the irradiation of the silicon oxide would inhibit the formation of corner areas in the active areas as the silicon oxide would densify as disclosed by the Seward reference.

With respect to Claim 6 and 12, the density of the silicon oxide would simply be a matter of optimization. Where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation. See *In re Aller*, 105 USPQ 233, 235 (CCPA 1955). Moreover, the

determination of the optimum or workable ranges of a variable, is characterized as routine experimentation. See *In re Antoinei*, 559 F. 2d 618, 195 USPQ 6 (CCPA 1977).

With respect to Claims 7 and 13, it would have been obvious for one of ordinary skill in the art, to deposit silicon dioxide by CVD in view of the disclosure of Herd. See column 1, lines 15-20 of Herd.

Response to Applicants' Arguments

Applicants' argue that the Examiner has the burden of establishing a *prima facie* case of obviousness, and that in the present case there is no motivation to combine the references. Applicants' argue that Herd teaches "photopolymers", and "photopolymers" are not "oxides" much less "silicon oxides" as required by the present Claims.

Applicants argue that there is no motivation for combining Herd with Seward, from the Examiner's flawed premise or otherwise, and one of ordinary skill in the art would not replace the "photopolymers" of Herd with "silicon oxide".

The Examiner maintains that Herd discloses a photopolymer which contains 70 to 80 % of silicon dioxide, and therefore reads on the present claims which require silicon dioxide. See column 6, lines 15-20.

Applicants argue that this modification of Herd would render it unsatisfactory for its intended purpose, as the substitution of silicon oxide in the context of Herd would not allow the "washing away" of Herd. The Examiner maintains that there is no evidence to support the Applicants conclusion, and maintains that it would have been obvious for one of ordinary skill in the art that treating silicon oxide with ultraviolet radiation as

Art Unit: 2812

disclosed by Herd et al densifies it, as required by the present Claims, as Seward discloses that ultraviolet radiation densifies silicon oxide.

Allowable Subject Matter

Claims 14-19 are allowed.

The following is an examiner's statement of reasons for allowance: The cited prior art does not anticipate or make obvious *inter alia* , forming a thin layer of thermal silicon oxide along the walls of an active area of a semiconductor device and forming a thin layer of thermal oxide along the walls and bottoms of shallow trenches laterally adjacent to the active are; depositing silicon oxide into the shallow trenches; and irradiating the silicon oxide in the shallow trenches wherein a gate overlaps the shallow trenches, as required by the afore mentioned Claims.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within

Art Unit: 2812

TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alexander G. Ghyka whose telephone number is (571) 272-1669. The examiner can normally be reached on Monday through Friday during general business hours.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Lebentritt can be reached on (571) 272-1873. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2812

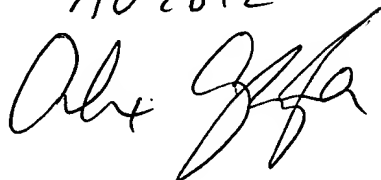
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AGG

December 8, 2006

ALEXANDER GHYKA
PRIMARY EXAMINER

AV 2812

A handwritten signature in black ink, appearing to read 'Alex Ghyska', written over the printed name and the application number.